

REVIEW

Spatial Processes in Ecology.—D. Tilman and P. Kareiva (eds.) *Spatial Ecology: The role of space in population dynamics and interspecific interactions*. ca. 1997, Princeton University Press, Princeton, NJ, USA, 368 pages.

Ecologists are becoming increasingly aware of the potential impact of spatial processes on ecological phenomena. The incorporation of spatial considerations into models of population dynamics and interspecific interactions can drastically change predicted outcomes. This timely book provides a broad and stimulating sampling of current directions in the field of spatial ecology. The contributing authors analyze the role of space in processes such as: ecological invasions, metapopulation dynamics, host-parasitoid systems, disease dynamics, interspecific competition, and species extinctions. Many of these analyses clearly demonstrate a significant impact of space on the outcomes of ecological processes.

The book is an edited volume and the chapters vary greatly in both their style and content. Most notably, some chapters do an excellent job of melding theory and data to tell a complete story of the impact of space on the topic under consideration. For example, the chapter by Antonovics et al. utilizes extensive, long-term survey data as well as relevant theory to investigate the interaction between genetic variation and population dynamics in metapopulations of a pathogenic fungus and its host plant. The chapter by Hanski on metapopulation models and the chapter by Ferguson et al. on the dynamics of measles also clearly describe the relevant spatial theory and explore the applicability of this theory to relevant data.

Other chapters rely solely on a description of the theoretical aspects of a problem without ever discussing a real world application or an appropriate data set. Although the book is clearly based on theory, such analyses devoid of data may leave some readers feeling unsatisfied. While we don't consider the use of data to be an absolute requirement for a well-written book chapter, the chapters in this book that incorporate data are clearly stronger and more readable for a general audience. Too much of a gap already exists in the world of ecology between scientists generating theory, doing field work, and managing ecological systems. Including relevant data sets when discussing theoretical approaches is a good first step in integrating these three areas of ecology, and will allow appropriate theory to be more easily used by scientists to generate questions, interpret empirical results, or manage populations.

The strong variability among chapters results both from the variety of topics covered and from variation in clarity of writing. Although each chapter focuses on some aspect of spatial theory that may seem quite complex to the non-theoretician, most chapters do a good job of discussing the assumptions and implications of the theory in plain English. There are a few exceptions to this, however, and a general reader may find him/herself occasionally frustrated by the excessive technical jargon and math-speak of a few chapters.

The first chapter provides a good broad overview of the ways in which space has been incorporated into models of population dynamics and interspecific interactions in the past. This chapter is very readable and provides a great introduction to the book. Subsequent chapters vary in how interesting they will be to a general audience. While some of the chapters (such as the Ferguson et al. measles chapter) seem intended for a very specific audience of academics doing research in that field, and other chapters are targeted for the more generally interested academic ecologist, this book was clearly written for an academic audience. Although the chapters in the book at times seem to be striving to make a link between spatial theory and possible applications such as conservation, in the end this really isn't a book that will be of much interest or use to those outside of the academic community. For example, Roughgarden makes some progress towards applying spatial theory to real problems by deriving the "production functions" for a variety of spatial models. These production functions, in some systems, can be used to guide sustainable harvest of food species. However, the analysis has not yet been developed to the point where the information is useful or accessible to those making decisions about harvests. The spatial models discussed in the book tend towards complexity and the discussions in each chapter are model-driven without clear applications to current applied ecological problems.

The final chapter of the book deserves special mention. In this chapter, Steinberg and Kareiva discuss future possibilities for investigating the role of space via manipulative field experiments. Their analysis of how space can and cannot be investigated is both revealing and fascinating. From their discussion it seems clear that some aspects of the study of spatial ecology are not amenable to standard experimentation due to the weak expected effect of space on the experimental outcome (e.g. experiments would require unrealistically large numbers of replicates to demonstrate an effect).

If you are interested in the role of space in ecol-

ogy and in understanding current thinking on how space may affect ecological phenomena, then this is the book for you. The list of authors is impressive and their expertise is clear. The book is also quite comprehensive, as we mentioned above, and will serve as a good summary of the role of space in ecology. If you are a resource manager or an en-

dangered species expert, looking for some guidelines on how to deal with the spatial aspects of your system, you probably need to look elsewhere.

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